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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/722,444

11/28/2003

Akinari Takagi

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EXAMINER

SHAPIRO, LEONID

ART UNIT

PAPER NUMBER

2629

DATE MAILED: 09/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/722,444	TAKAGI, AKINARI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Leonid Shapiro	2629	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 November 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 10-15 is/are rejected.
- 7) ☒ Claim(s) 8 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>10-14-04 3-11-04</u>  | 6) <input type="checkbox"/> Other: _____                                    |

### ***Specification***

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7,13-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Muramoto et al. (6,507,359 B1).

As to claim 1, Muramoto et al. teaches system (See Col. 1, Lines 9-17),  
comprising :

a pair of image observation devices each having i) an image pickup device (See Fig. 14, items A-B), ii) an image pickup optical system for directing light rays from an outside world to said image pickup device (See Fig. 13A, items 203,4-5, Col. 12, Lines 46-53), iii) a display device for displaying an outside world image obtained by said image pickup system (See Fig. 5, items 333-334, Col. 8, Lines 50-66), and iv) a display optical system for directing light from said display device to an observing eye (See Fig. 5, items 335-336, Col. 9, Lines 3-9),

wherein, where an axis containing a center of an entrance pupil of said image pickup optical system and a point being conjugate with a center of said image pickup device with respect to said image pickup optical system is taken as an optical axis of an image pickup system (See Fig. 14, items A-B) while an axis containing a center of an exit pupil of said display optical system and a point being conjugate with a center of said display device with respect to said display optical system is taken as an optical axis of a display system, the optical axis of the image pickup system and the optical axis of the display system optical axis are disposed coaxially (See Fig.5, items 337-338,363-364),

wherein the optical axes of the image pickup systems of the pair of image observation devices define a point of intersection (See Fig. 14, items A-B), and

wherein a focal plane being at a position conjugate with a surface of said image pickup device with respect to said image pickup optical system is disposed at a side of the intersection point of the optical axes of the image pickup systems, which side faces an observer (See Col. 15, Lines 29-54).

As to claim 2, Muramoto et al. teaches the focal plane of said image pickup optical system is fixed at a predetermined position (See Col. 15, Lines 29-54).

As to claims 3,6,15 it generally considered to be within the ordinary skill in the art to adjust, vary, select or optimize the numerical parameters or values of any system absent of showing criticality of in a particular recited value. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the focal plane of image pickup optical system is set at a distance not greater than 1 m from the observer's position. Such a limitation would have been considered as obvious variation on the matter of selected thickness which fails patentably distinguish over the prior art of Bowman et al. and Yates et al. In re Rose, 105 USPQ 237 (CCPA 1955).

As to claims 4-5,7, Muramoto et al. teaches a virtual image position of a center view angle of each display system, corresponding to a position conjugate with the center of the display device in the pair of image observation devices, with respect to the display optical system, is approximately coincident with the intersection point of the optical axes of the image pickup system, (See Fig. 5, items M,M' and Fig. 14, items A-B, Col. 15, Lines 29-54).

As to claim 13, Muramoto et al. teaches image creating means for producing an image and image synthesizing means for combining an image from said image creating means and an image from said image pickup system so that a combined image is displayed upon said display device (See Fig. 12, items 24,101, Col. 12, Lines 5-45).

As to claim 14, Muramoto et al. teaches entrance pupil position of image pickup optical system is disposed with a shift, toward the outside world, from the exit pupil

Art Unit: 2629

position of said display optical system (See Figs. 13A-13B, items 17-18, Col. 13, Lines 9-20).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Muramoto et al. in view of Itoh (US Patent No. 6,671,103 B2).

Muramoto et al. does not disclose image pickup optical system includes i) a prism with plural planes having a transmission function and a total reflection function, and ii) an optical element disposed in a portion of an optical path between said prism and said image pickup device and having a positive optical power.

Itoh teaches image pickup optical system includes i) a prism with plural planes having a transmission function, and ii) an optical element disposed in a portion of an optical path between said prism and said image pickup device and having a positive optical power (See Fig. 1, items L3,IP, Col. 5, Lines 34-44).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate teachings of Itoh into Muramoto et al. system in order to improve optical performance (See Col. 2, Lines 54-57 in the Itoh reference).

4. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muramoto et al. in view of Morita et al. (US Patent No. 5,844,670).

Muramoto et al. does not disclose image pickup optical system has an eccentric and non-rotationally symmetric reflection surface having an optical power being different in accordance with an azimuth angle.

Morita et al. teaches image pickup optical system has an eccentric and non-rotationally symmetric reflection surface having an optical power being different in accordance with an azimuth angle (See Fig. 12, , Col. 18, Lines 18-40).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate teachings of Morita et al. into Muramoto et al. system in order to improve optical performance.

#### ***Allowable Subject Matter***

5. Claims 8-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Relative to claim 8 the major difference between the teaching of the prior art of record (Muramoto et al.) and the instant invention is that the distance from entrance pupil of said image pickup optical system to a focal plane of said image pickup optical system is H, the size of the entrance pupil of said image pickup optical system is D, the focal length of said image pickup optical system is f, and the size of one picture element

Art Unit: 2629

of said image pickup device is 1, the distance L from the entrance pupil of said image pickup optical system to the intersection point satisfies the following relation:

$$L \leq (fxDxH) / (fxD-axH).$$

Relative to claim 9 the major difference between the teaching of the prior art of record (Muramoto et al.) and the instant invention is that when a straight line perpendicular to the focal plane of said image pickup optical system and passing through the center of the entrance pupil of said image pickup optical system is taken as an optical axis of said image pickup optical system while a straight line perpendicular to the virtual image plane and passing through the center of the exit pupil of said display optical system is taken as an optical axis of said display optical system, the optical axis of one image pickup optical system of the pair of image pickup systems, which one is at the outside world side, and the optical axis of one display optical system of the pair of display systems, which one is at the eye ball side, are parallel to each other and are spaced by an even interval, and wherein the centers of the pair of image pickup devices are disposed with a shift of a predetermined distance, with respect to the optical axes of the respective image pickup optical systems, while the centers of the pair of display devices are disposed with a shift by a predetermined distance, with respect to the optical axes of the respective display optical systems, whereby the point of intersection of the optical axes of the pair of image pickup systems is defined.




***Telephone Inquire***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 571-272-7683. The examiner can normally be reached on 8 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on 571-272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LS  
10.03.06



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